Evolutionary Computation

Jan. 28, 2013; 14-17hrs.

This is a 'closed book' exam: you can only use a single sheet of paper with your own, self-written notes (A4, double-sided). Write your name, student number and study program on the first page, and your name on any extra pages.
DO NOT BE TOO BRIEF: ALWAYS CLARIFY YOUR ANSWER !!!

1. How can the Adaptive Pursuit algorithm be applied to design an adaptive version of Iterated Local Search ?
2. Explain how mutation is done in the Evolutionary Strategies algorithm.
3. How does the Linkage Tree Genetic Algorithm works ?
4. Explain in detail how the Gambler's ruin model can be used to derive the minimal population size needed to reliably solve the counting-one problem.
5. Assume we have a 2-objective optimization problem where both objectives need to be minimized.
   (a) Draw an example of a Pareto front that has optimal solutions on the front that cannot be found be using a linearly weighted aggregation function.
   (b) Explain why population-based selection using domination counts can in principle find these solutions.
6. The run-time behavior of a stochastic local search algorithm can be measured by plotting the (empirical) probability of reaching an optimal solution as a function of the run time of the algorithm. Discuss how this graph can be used to determine an optimal stopping time of the stochastic local search algorithm after which the algorithm is started again from a newly generated, random solution.
7. Explain the Fitness Distance Correlation concept. What is it used for ?